

GLEEMAN *Pentaphonic*

FIVE VOICE POLYPHONIC SYNTHESIZER

OPERATION MANUAL

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OPERATION MANUAL**

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SECTION 1.0 INTRODUCTION

The Gleeman Pentaphonic is a 5-voice polyphonic synthesizer. Each voice consists of one 4-pole lowpass voltage-controlled filter, one voltage-controlled amplifier, 2 envelope generators or ADSRs, and three digitally-controlled oscillators. Fig. 1 shows the Pentaphonic system.

The Pentaphonic also contains a microcomputer which assigns a particular voice to a struck key. It also determines the frequency of a played note, remembers sequences, and outputs gates and triggers for the ADSRs.

This manual will not deal heavily with music synthesis theory, but how to get the user started with his own exploration of various sounds using the Pentaphonic as a tool.

Although the Pentaphonic may be used to mimic many other instruments such as strings, horns, and piano, it can do much more. Sounds such as "plucked horn", "bass piccolo" or other in-between instruments are also possible.

SECTION 2.0 SET-UP AND POWER ON

To set up the Pentaphonic simply plug its power cord into a 120 volt A.C. outlet. Then turn the power switch located on the rear panel to ON. The LED pilot light located above the Presetter/Joystick panel should light.

Since the Pentaphonic has a built-in amplifier and speaker no external amp is needed. However, an external amplifier can be connected to the AMP jack located on the rear panel.

If you are unfamiliar with synthesizers try setting all knobs to center position as a starting-off point to hear your first sound.

WARNING

Caution should be used in operating this or any other electrical device.

Always plug this unit into a standard 120VAC outlet only.

Avoid using overcrowded outlets or underrated extension cords.

Never operate this unit near any moisture.

There are no user-serviceable parts inside the Pentaphonic, and it should be serviced by authorized personnel only.

The Pentaphonic requires a 1 amp fast-blow fuse (1AG or equiv.) Do not use any other type of fuse. Always unplug the unit before changing the fuse.

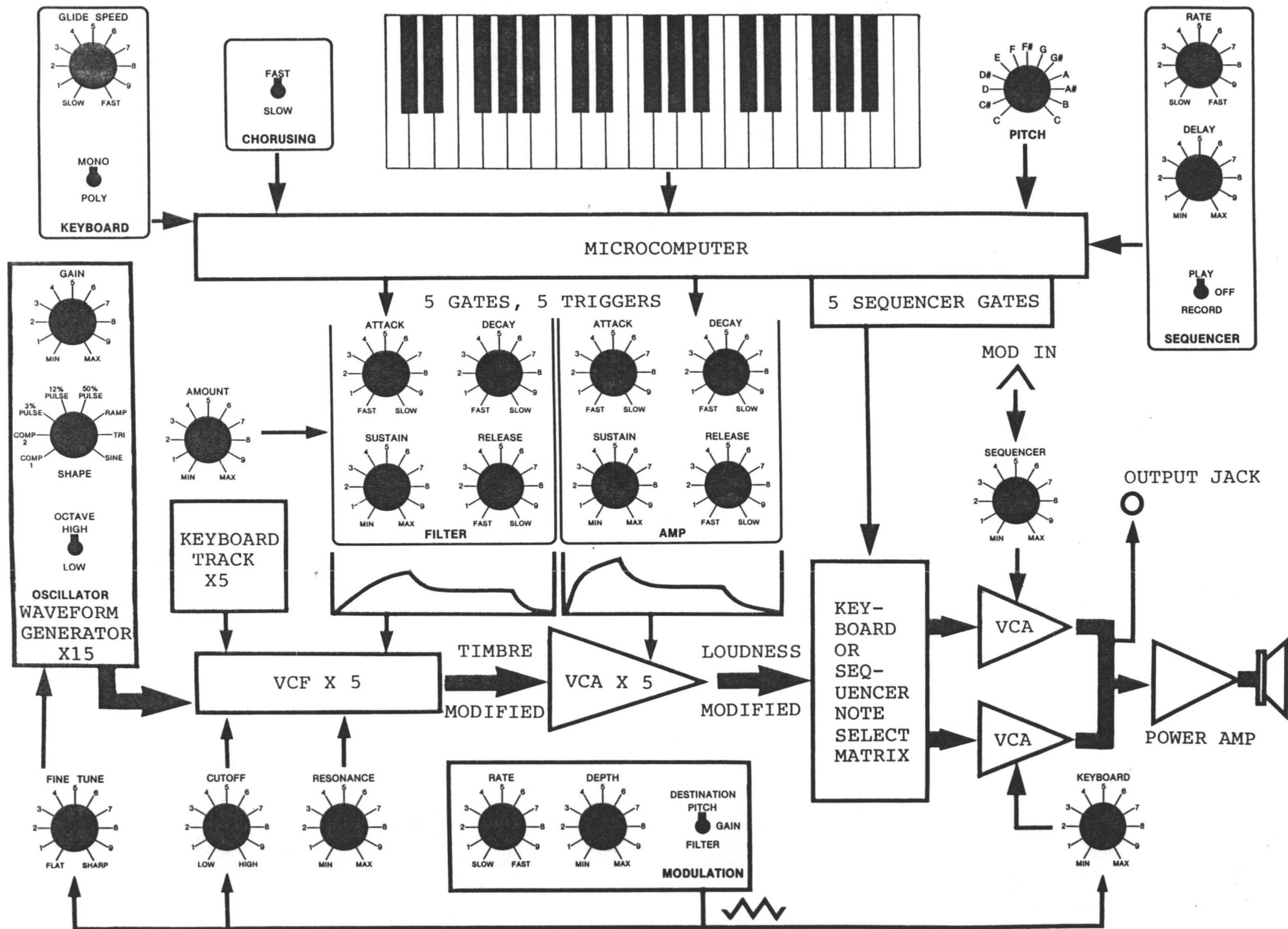


FIGURE 1 PENTAPHONIC SYSTEM

Failure to follow safety precautions and operating instructions voids all warranties and frees Gleeman Instruments from any liabilities incurred. See the Warranty section (Section 7) for details.

SECTION 3.0 PRESETTER/JOYSTICK PANEL

The Presetter/Joystick Panel is shown in Fig. 2. The Pentaphonic may be purchased with the Presetter installed or it may be added later in the space provided.

SECTION 3.1 PRESETTER

The Presetter has a memory which allows the user to store 100 sounds (patches), with each sound comprised of the settings of up to 24 front-panel knobs and switches.

Factory presets are stored in Presets 50 to 99, leaving Presets 00 to 49 open for the user's own patches.

The Factory Preset Chart in Fig. 3 lists which knobs and switches are presettable and how the factory sounds were set up.

To program the Presetter use the controls on the front panel in the usual manner to obtain the desired sound, then with the desired preset number showing on the 2-digit leverswitch push the STORE button.

To select a stored preset move the levers until the desired number appears on the leverswitch, then actuate (RECALL).

To obtain instant sound changes as the leverswitch is changed, position the toggle switch to RECALL. Note that electrically, RECALL and (RECALL) are identical.

A sound may be placed in two or more locations without changing the front panel controls. To do this, select a preset and activate (RECALL), allowing the toggle switch to return to the middle position. Then set the leverswitch to the new (destination) location and hit STORE. The preset will now occupy the old and new locations.

The user may want to edit or change a preset by a small difference in sound. To do this select the desired preset on the leverswitch and activate RECALL or (RECALL). The presettable knobs and switches may be moved slightly to break them free of their preset value. When the sound is satisfactory hit STORE to save the modified sound in memory.

SECTION 3.2 JOYSTICK

The Joystick is a spring loaded, 2-axis controller. Its lever can be moved along a horizontal or vertical axis or anywhere in between.

The horizontal or PITCH BEND axis can be used to lower a keyboard note or chord by up to 5 semitones when pushed to the left of center, When pushed to the right of center a keyboard note or chord can be raised up to 5 semitones.

The PITCH BEND axis does not alter the pitch of the Sequencer.

The vertical axis is split into two halves; MOD and CUTOFF. When the stick is moved forward the Modulation Depth will increase. The type of modulation will be determined by the position of the DESTINATION switch.

When the stick is pulled back the Cutoff Frequency of the Filter will increase and make the sound brighter.

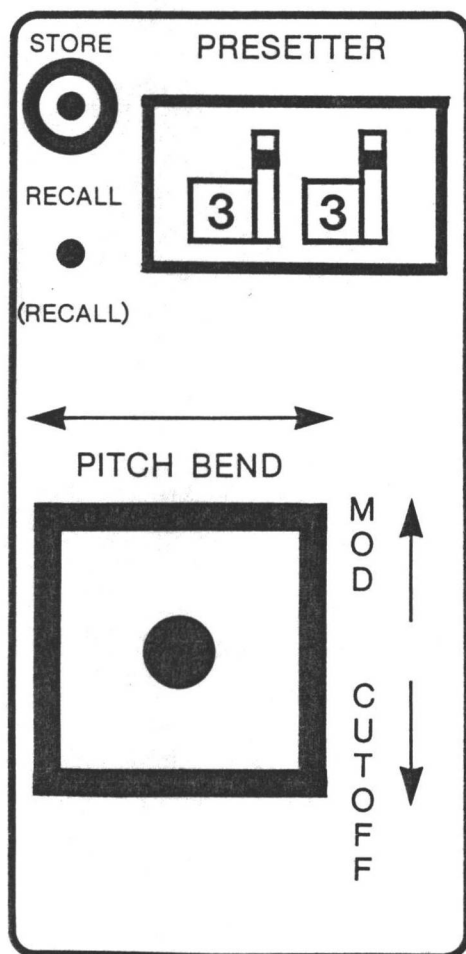
The Joystick adds to the Cutoff or Mod Depth already in effect by the respective front panel controls (or footpedals if connected). Therefore if the Cutoff control is at Max the Joystick will have no effect in that direction.

The Joystick is used with great effect when changing two different parameters of the sound at the same time by moving the stick at various angles to the horizontal and vertical axes. For example, the stick may be moved toward the upper right hand corner to create an upward pitch bend and a simultaneous increase in vibrato.

When a preset patch is being played and a front-panel knob is changed, that control will instantly go from preset mode (the setting in memory) to non-preset mode (the setting of the knob) and may sound like a click. This is normal and only momentary.

NOTE:

A fully manual (non-preset) condition may be obtained by turning the power switch on the rear panel OFF then ON with the RECALL switch in the middle position. At this time the user may create entirely new sounds and store them anywhere in the 100-preset memory simply by selecting the desired preset number then pressing STORE.



Recall a preset from memory

1. Select desired preset no.
2. Hit RECALL or (RECALL).

Save a patch in memory

1. Set RECALL switch to middle position.
2. Select desired preset no.
3. Hit STORE.

Modify existing patch

1. Recall desired preset
2. Modify as needed with front panel controls.
3. Hit STORE.

Move patch to new location

1. Recall old patch.
2. Modify if necessary.
3. Set RECALL switch to middle position.
4. Select new location.
5. Hit STORE.

FIGURE 2 PRESETTER/JOYSTICK PANEL

No.	Name	Chorus	Osc 1			Osc 2			Osc 3			Modulation			Filter				Amp						
			Gain	Shape	Oct	Gain	Shape	Oct	Gain	Shape	Oct	Rate	Depth	Dest	Cut off	Amt	Res	A	D	S	R	A	D	S	R
50	typ. piano	S	5	ramp	H	5	ramp	H	5	ramp	H	0	0	gain	2	4	0	0	8	2	7	0	8	0	7
51	Rhodes	S	6	sin	H	5	sin	H	5	sin	H	0	0	gain	3	3	0	0	7	2	6	0	7	0	7
52	honkytonk	F	5	ramp	L	5	ramp	L	5	ramp	L	0	0	gain	4	4	3	0	6	2	6	0	6	0	6
53	harpsichord	F	7	3% P	H	0	3% P	H	0	3% P	H	0	0	gain	8	8	3	0	7	0	4	3	6	0	2
54	electric	S	7	3% P	H	5	sin	H	5	sin	H	0	0	gain	3	5	4	0	7	3	7	3	6	3	7
55	clarinet	S	7	50%P	H	0	50%P	H	0	50%P	H	2	0	pit.	3	3	0	5	7	3	5	3	5	5	5
56	flute	S	5	sin	H	0	sin	H	0	sin	H	2	0	pit.	4	3	2	6	5	3	3	6	0	8	4
57	bassoon	S	5	3% P	L	0	3% P	L	0	3% P	L	2	0	pit.	4	3	0	6	8	3	3	5	7	2	4
58	oboe	S	5	3% P	H	0	3% P	H	0	3% P	H	2	0	pit.	3	3	3	6	7	5	7	5	7	5	4
59	multiwoods	S	5	50%P	H	5	50%P	H	5	50%P	H	2	0	pit.	5	4	0	5	7	5	7	5	7	5	4
60	typ. string	S	5	ramp	H	5	ramp	H	5	ramp	H	2	2	pit.	5	5	0	3	7	5	6	6	7	5	5
61	viola	S	5	ramp	L	5	ramp	L	5	ramp	L	2	2	pit.	4	5	0	1	5	5	6	6	7	5	5
62	pluck bass	S	7	ramp	L	7	ramp	L	7	ramp	L	2	0	pit.	2	5	0	0	4	3	6	0	8	0	5
63	mixed	S	5	3% P	H	8	ramp	L	8	12%P	L	2	0	pit.	4	3	0	6	7	6	6	6	7	6	5
64	cello	S	5	ramp	L	7	ramp	L	7	ramp	L	2	2	pit.	4	4	0	3	8	3	5	7	8	0	5
65	marimba	S	5	sin	H	5	sin	H	5	sin	H	2	1	pit.	2	4	5	0	7	2	7	0	6	2	6
66	blocks	S	6	sin	H	6	sin	H	6	sin	H	0	0	pit.	4	4	1	1	4	0	1	1	4	0	1
67	bells	S	5	cmp1	H	5	cmp1	H	5	cmp1	H	2	4	gain	1	7	2	0	8	4	9	0	8	2	7
68	vibes	S	5	tri	H	2	tri	H	2	tri	H	2	4	gain	3	5	4	0	0	3	7	0	0	4	6
69	steel drum	F	7	sin	H	5	tri	H	3	tri	L	0	4	gain	5	4	5	0	3	3	3	0	6	0	4
70	typ. organ	S	5	cmp2	H	5	cmp2	H	5	cmp2	L	0	0	gain	4	4	0	6	4	7	4	5	3	7	5
71	mute pipe	S	5	sin	L	5	sin	L	8	50%P	H	2	2	pit.	4	8	0	2	3	2	3	4	0	3	4
72	click org.	F	10	sin	H	4	sin	L	10	50%P	H	2	2	pit.	3	8	0	0	0	3	4	0	0	4	4
73	calliope	S	5	sin	H	5	sin	H	5	sin	H	0	0	gain	2	3	4	3	7	8	5	3	7	7	4
74	vox humana	S	6	ramp	H	6	ramp	H	6	ramp	H	2	2	pit.	3	3	5	7	7	8	6	6	7	7	4

FIGURE 3 FACTORY PRESET CHART

No.	Name	Cho rus	Osc 1			Osc 2			Osc 3			Modulation			Filter				Amp						
			Gain	Shape	Oct	Gain	Shape	Oct	Gain	Shape	Oct	Rate	Depth	Dest	Cut off	Amt	Res	A	D	S	R	A	D	S	R
75	squeezebox	F	6	50%P	H	6	50%P	H	6	50%P	H	0	0	pit.	3	5	3	6	8	4	6	6	7	5	4
76	clav org.	F	6	3% P	L	5	sin	H	5	sin	H	0	0	pit.	3	4	4	3	6	6	5	1	8	4	5
77	brite org.	S	7	cmp1	H	7	cmp1	H	7	cmp1	H	0	0	pit.	4	5	0	0	7	6	3	1	9	7	3
78	celestial	S	5	ramp	H	5	tri	H	5	tri	H	0	0	pit.	2	5	0	5	7	5	4	5	6	6	5
79	church org	S	5	cmp1	L	8	cmp1	H	8	cmp1	H	0	0	pit.	4	4	0	0	7	7	5	4	7	7	7
80	clarion	S	10	3% P	H	5	ramp	H	5	ramp	H	2	0	pit.	4	4	0	7	6	3	4	4	8	3	6
81	trombone	S	10	ramp	L	0	ramp	L	0	ramp	L	3	0	pit.	3	4	2	6	7	5	5	2	8	6	4
82	trumpet	S	6	ramp	H	0	ramp	H	0	ramp	H	2	0	pit.	3	5	4	4	5	4	5	3	5	7	5
83	synth wow	S	0	ramp	L	0	ramp	L	0	ramp	L	0	0	pit.	3	3	10	5	6	0	6	0	6	0	6
84	space echo	S	0	ramp	L	0	ramp	L	0	ramp	L	4	5	filt	5	4	10	0	7	0	7	0	7	0	7
85	warp piano	S	10	12%P	H	5	ramp	H	7	ramp	H	2	0	pit.	3	5	6	0	5	3	6	0	5	5	6
86	reson-clav	S	10	cmp2	L	10	12%P	H	10	12%P	H	3	0	pit.	3	4	6	2	7	5	2	2	8	5	2
87	ben wah	S	10	cmp2	L	10	12%P	H	10	12%P	H	0	0	pit.	3	5	6	8	7	0	7	0	8	5	5
88	beep echo	S	6	12%P	H	8	ramp	H	8	ramp	H	2	3	filt	2	10	3	2	5	3	0	2	6	8	6
89	blip horn	S	10	ramp	H	10	ramp	H	10	ramp	H	4	3	filt	0	10	0	0	7	0	7	3	6	0	3
90	wah piano	S	7	3% P	H	5	sin	H	5	sin	H	0	0	gain	3	4	5	7	7	3	7	1	6	3	7
91	ow organ	S	5	3% P	L	5	3% P	L	5	3% P	L	2	1	pit.	4	5	4	5	7	2	6	0	7	3	7
92	drums	S	0	50%P	H	0	50%P	H	0	50%P	H	0	0	gain	2	1	10	0	8	0	2	0	6	0	4
93	struck pipe	S	5	3% P	L	5	50%P	L	5	50%P	L	0	0	pit.	3	5	4	0	4	3	6	0	0	7	6
94	mouse org.	S	10	3% P	H	5	3% P	H	5	3% P	H	3	0	pit.	3	6	5	5	0	0	5	0	6	0	3
95	bass picc.	S	10	ramp	L	8	cmp2	H	8	cmp2	H	3	0	pit.	3	4	2	6	7	5	5	2	8	6	4
96	pianovibe	S	4	3% P	H	4	3% P	H	10	cmp1	H	2	2	pit.	2	7	2	0	4	3	3	0	7	0	4
97	wahoo	F	10	ramp	L	4	ramp	H	4	ramp	H	0	2	pit.	0	10	4	6	4	3	4	0	9	0	6
98	bassvibe	F	10	3% P	L	7	sin	L	5	sin	L	2	2	filt	1	6	4	2	4	3	5	2	7	0	6
99	rubberband	F	10	3% P	L	0	cmp1	L	0	cmp1	L	3	4	gain	3	5	5	2	5	0	1	0	6	0	2

FIGURE 3 FACTORY PRESET CHART

SECTION 4.0 FRONT PANEL

The Front Panel is shown in Fig. 4. The discussion that follows will take the controls in order from left to right.

SECTION 4.1 PITCH

The PITCH Section is located at the upper left hand side of the Front Panel.

The FINE TUNE Control shifts the pitch of the keyboard and sequencer up or down 3 semitones. It can be used to tune the Pentaphonic to another instrument.

The PITCH control moves the keyboard and sequencer up or down in pitch in 13 distinct semitone steps from low-C to high-C. This can be used to chromatically transpose the keyboard and sequencer into any key much like using a capo on a guitar.

SECTION 4.2 CHORUSING

The CHORUSING switch varies the frequency of Oscillators 2 and 3. The SLOW position tunes Oscillators 2 and 3 plus and minus 0.39% from Oscillator 1. This produces slow beating of the oscillators.

The FAST position tunes Oscillators 2 and 3 plus and minus 0.78% from Oscillator 1. This produces fast beating of the oscillators.

SECTION 4.3 SEQUENCER

The Sequencer is a polyphonic digital recorder that will store a 300-note polyphonic phrase or a 241-note monophonic phrase. The exact length of the maximum sequence is computed by dividing 960 by the sum of key-down events, key-up events, and time intervals (every 84 msec to 840 msec depending on the RATE control).

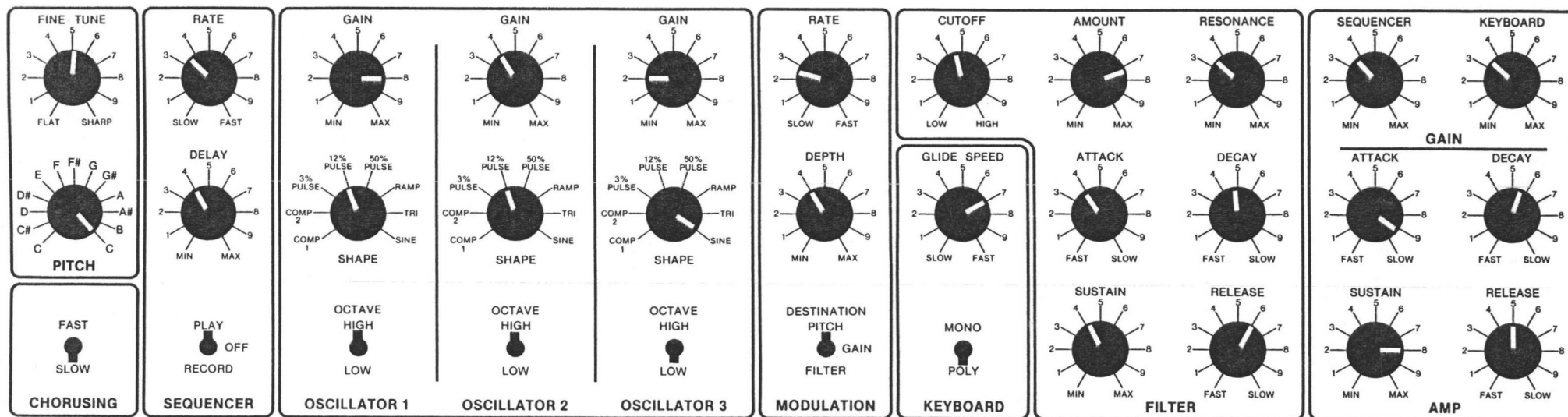


FIGURE 4 FRONT PANEL

The Sequencer also keeps track of the Keyboard Mode switch. Switching from Mono to Poly during sequence recording for example will result in the same change occurring in the same place during playback.

To record a sequence set the Sequencer Mode switch to RECORD and play normally on the keyboard. The Sequencer starts recording when the first note is played and stops when the last note is released. Time from the release of the last note to the changing of the Sequencer Mode switch is not recorded.

To play back the recorded sequence set the Sequencer Mode switch to PLAY and turn up the SEQUENCER Gain control in the AMP section. The Sequencer will repeat a musical phrase constantly until the Sequencer Mode control is set to the OFF position.

While the Sequencer is repeating your phrase, the keyboard remains fully active and can be played in duet with the Sequencer. The keyboard mode is independent of the sequencer mode. If the sequencer is playing a polyphonic sequence with chords, the user can play a monophonic glide accompaniment.

However, the keyboard has priority over the sequencer. For instance if a polyphonic sequence using all five voices is being played back, a keyboard note will 'steal' a voice from the sequencer.

The rest time between each repetition of the sequence is determined by the DELAY control. DELAY can be used to obtain a musically pleasing transition between the end of the sequence and the beginning of the next cycle.

The RATE control is used to speed up or slow down the sequence during playback. It also affects the time resolution during sequence recording. A 10-to-1 speedup may be obtained by recording with the RATE at minimum and playing back with RATE set to maximum.

SECTION 4.4 OSCILLATORS

The Pentaphonic's sound source is a bank of oscillators arranged as three oscillators per voice times five voices (15 total). The oscillators are temperature stable and will not drift. They require no warmup time and are in tune as soon as the power is turned on.

The oscillator sections each have identical GAIN, SHAPE, and OCTAVE controls but each is tuned slightly differently to create the chorusing effect. If this effect is not needed the gain controls of Oscillators 2 and 3 can be set to MIN.

The GAIN control gives the user the ability to mix the amplitudes of the oscillators in any proportion.

The SHAPE control selects one of eight possible waveforms. These shapes are shown in Fig. 5. The first two waveshapes are COMPLEX 1 and COMPLEX 2. These are two new complex waveshapes not usually found on a synthesizer and are included for their unique harmonic qualities. The 3%, 12%, and 50% PULSE (square wave) refer to the duty cycles of the three rectangular shapes and are useful for various woodwind sounds. The RAMP (sawtooth) shape has both odd and even harmonics and is most effective for string sounds. The TRIANGLE and SINE waveshapes contain the least harmonic content and are useful for pipe sounds and bass fill.

The OCTAVE switch allows each oscillator section to be set to either LOW or HIGH octave. This is used to achieve a greater range on the keyboard.

SECTION 4.5 MODULATION

The Modulation section is used to create vibrato and tremolo effects for both the keyboard and sequencer. The source of this modulation is a low frequency triangle-wave oscillator.

The RATE control varies the frequency of the triangle wave from 0.1 Hz to 30 Hz.

The DEPTH control varies the amplitude of the triangle wave. This gives the effect of more or less intensity of modulation.

The DESTINATION control determines whether the modulation will affect the oscillators, amplifiers, or filters. If it is set to PITCH, a vibrato effect is heard. When switched to GAIN, volume is affected and a tremolo effect is heard. The FILTER position applies the modulation to the cutoff frequency of the filters. The result is perceived as phase shift and/or tremolo depending on the settings of the Modulation and Filter sections.

SECTION 4.6 KEYBOARD

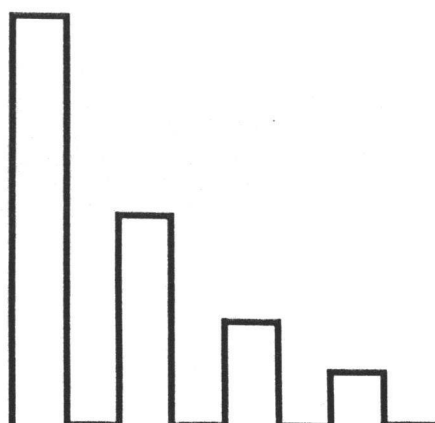
The KEYBOARD section contains the Keyboard Mode switch and the Glide Speed control.

When the Keyboard Mode switch is in the MONO position only one note will sound at a time. If two keys are struck only the higher pitched one will sound (high-note priority).

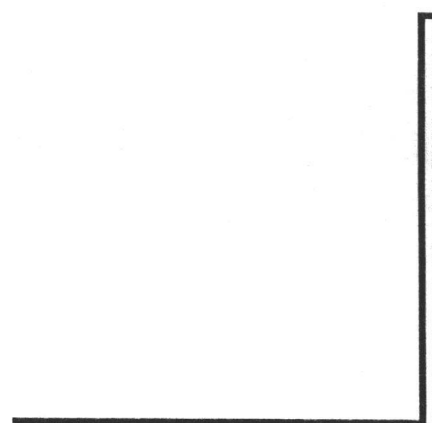
The GLIDE SPEED control adjusts the speed at which the pitch changes from one note to the next in the monophonic mode. The distance between the notes also determines glide speed. Notes closer together will have a faster glide than notes farther apart.



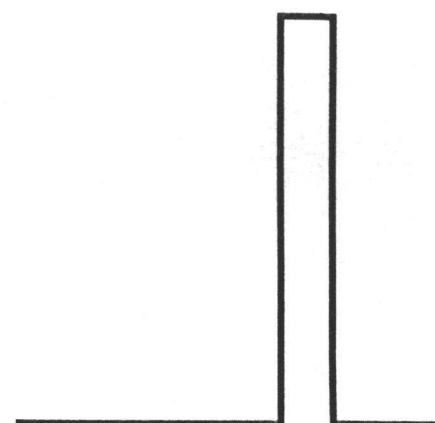
COMP 1



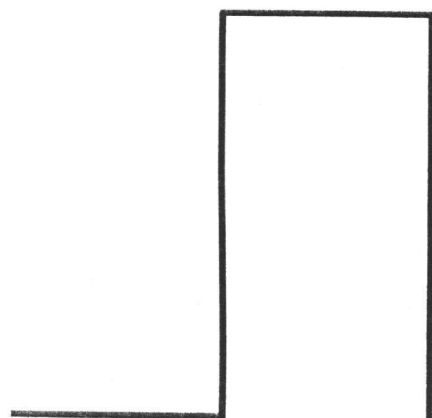
COMP 2



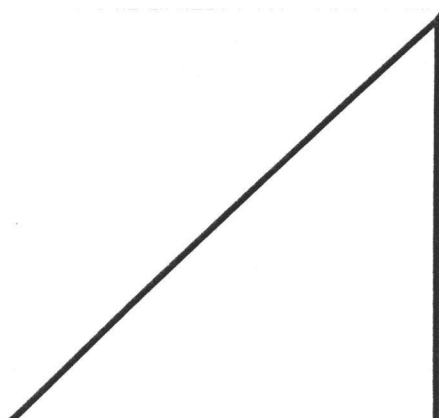
3% PULSE



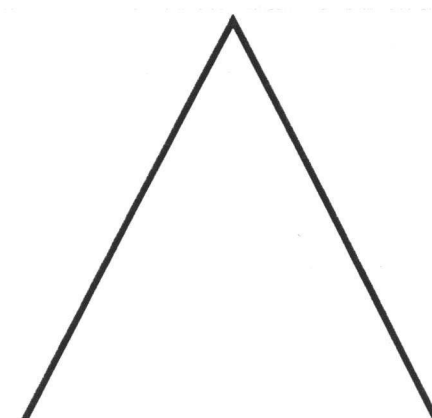
12% PULSE



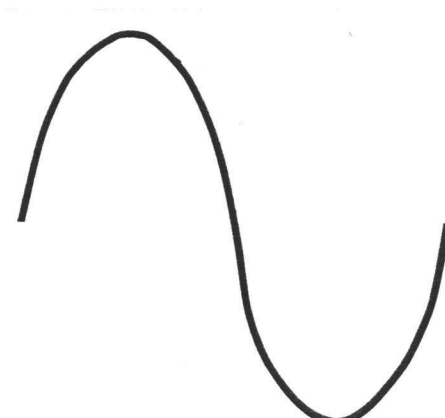
50% PULSE (SQUARE WAVE)



RAMP (SAWTOOTH)



TRI



SIN

FIGURE 5

When the switch is in the POLY position 5-note chords are possible. When a sixth note is played the assignment algorithm attempts to pick the synth section which played that note in the past. If one cannot be found the algorithm will use the synth section playing the oldest (earliest played) note. Keyboard notes always take priority over sequencer notes, and the newest (last played) keyboard note, even if released, has priority over a fifth sequencer note.

SECTION 4.7 FILTER

The filter section is a bank of five 4-pole lowpass filters which color the output of the oscillators by reducing (attenuating) the higher harmonics. It can be used both manually via the front panel controls or automatically as keys are pressed using the envelope generators (ADSR).

The CUTOFF is a manual tone control. It adjusts the cutoff frequency which is the frequency at which the filters begin to attenuate. Lower frequencies are passed with little or no attenuation, while higher frequencies are attenuated at a rate of 24 dB per octave. If the Cutoff Footpedal is installed it takes over this job from the Cutoff Knob.

The RESONANCE control emphasizes the filters' gain at the cutoff frequency. Higher settings of this control cause the filter response to resemble that of a bandpass rather than lowpass filter. If turned to MAX the filters will oscillate at the cutoff frequency. If this is desirable for special effects purer sound will be obtained by reducing the oscillator gain controls to MIN.

The ATTACK, DECAY, SUSTAIN, and RELEASE (ADSR) controls adjust the four stages of the envelope generator which in turn controls the cutoff frequency of the filter when a key is pressed and later released. See Fig. 6.

The ATTACK control adjusts the time, from 5 milliseconds to 5 seconds, that the filter sweeps from low to high cutoff when the key is pressed.

The DECAY control adjusts the time, from 5 milliseconds to 5 seconds, that the filter sweeps from its highest cutoff point to the level of the SUSTAIN knob.

The SUSTAIN control varies the cutoff frequency that the filter drops down to after the decay period.

The RELEASE control adjusts the time, from 5 milliseconds to 5 seconds, that the filter sweeps from the sustain level to its lower cutoff point. This stage takes place only after a key is released.

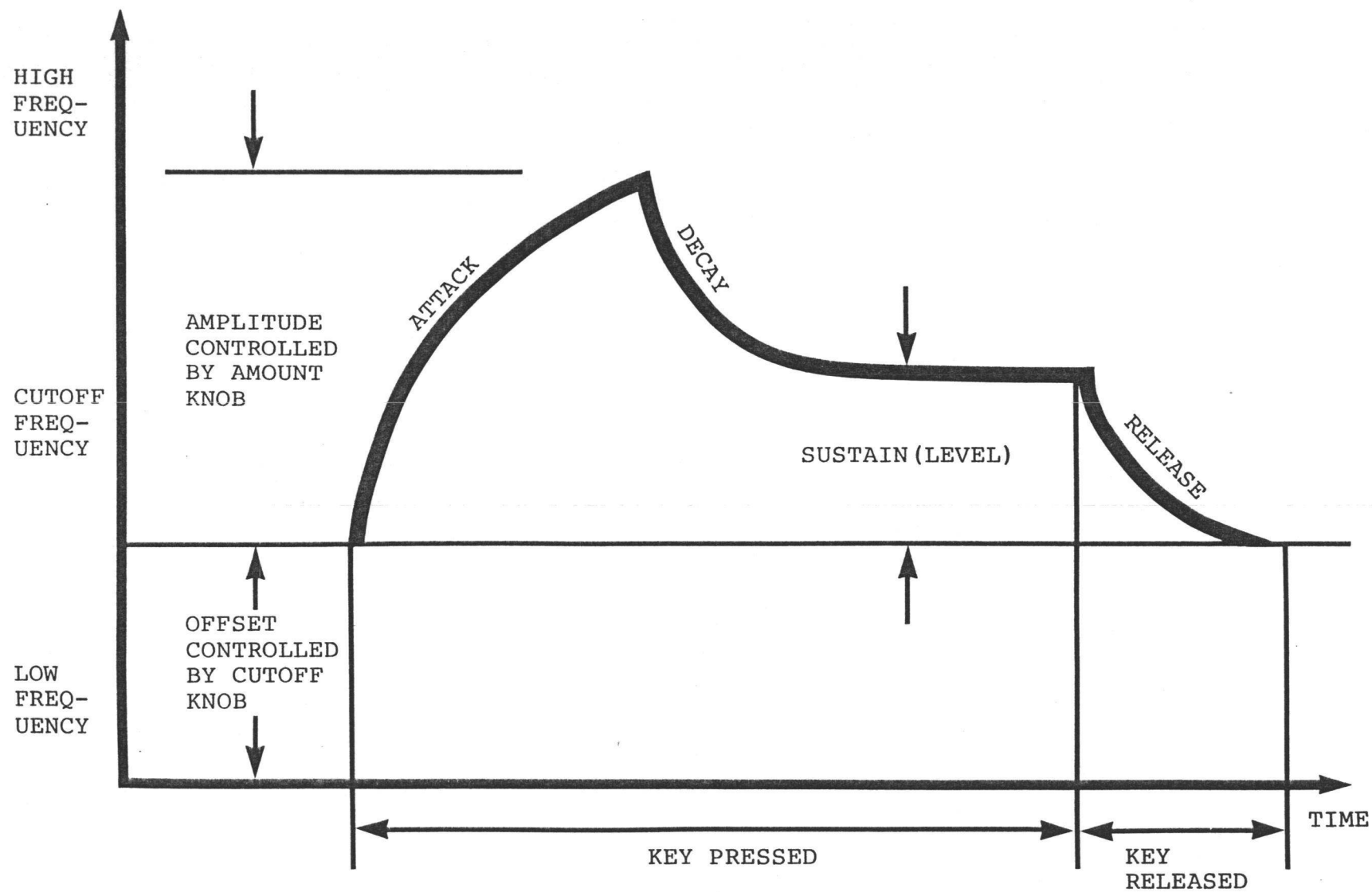


FIGURE 6 A TYPICAL ADSR ENVELOPE

The AMOUNT control adjusts the amplitude of the ADSR envelope applied to the filter cutoff. With the AMOUNT set to MIN no envelope is applied to the filter cutoff and the ADSR controls are ineffective.

SECTION 4.8 AMP

The ADSR in the AMP section is always engaged. Its ATTACK, DECAY, SUSTAIN, and RELEASE act the same as the filter ADSR but vary the volume with time instead of the harmonic content.

The ATTACK, DECAY, and RELEASE controls each have a time period of 5 milliseconds to 5 seconds. The SUSTAIN control adjusts the volume a note will have while a key is held down.

The SEQUENCER control adjusts the gain or volume of notes played by the sequencer when it is switched to play. This control is completely independent of the keyboard gain control.

The KEYBOARD control adjusts the gain or volume of notes played on the keyboard.

SECTION 5.0 REAR PANEL

The rear panel is shown in Fig. 7. There are four $\frac{1}{4}$ " standard phone jacks on the rear panel.

SECTION 5.1 OUTPUT JACKS

The STEREOPHONES jack accepts a 3-conductor stereo headphone which can range from 8 to 600 ohm impedance. Note that both channels are driven and are identical. The KEYBOARD and SEQUENCER gain controls are effective with phones. The internal speaker is disconnected when the stereophones are installed.

The AMP jack is used for connecting an external amplifier. When an external amp is plugged into the AMP jack the internal speaker is disconnected. When using an external amplifier the SEQUENCER and KEYBOARD gain controls should be turned up as high as possible without overloading the external amp for best signal-to-noise ratio.

SECTION 5.2 FOOTPEDAL JACKS

The FILTER CUTOFF jack accepts a footpedal capable of producing a control voltage of 0 to 9 volts D.C. When the footpedal is installed 0 volts will cause the filter to tune to minimum cutoff frequency and 9 volts will cause the filter to tune to maximum cutoff frequency. When the FILTER CUTOFF jack is in use the cutoff control on the front panel is disabled.

The MOD DEPTH jack accepts a footpedal capable of producing a control voltage of 0 to 9 volts D.C. When a footpedal is plugged in 0 volts will cause minimum modulation depth and 9 volts will cause maximum modulation depth. When the MOD DEPTH jack is in use the Modulation DEPTH control on the front panel is disabled.

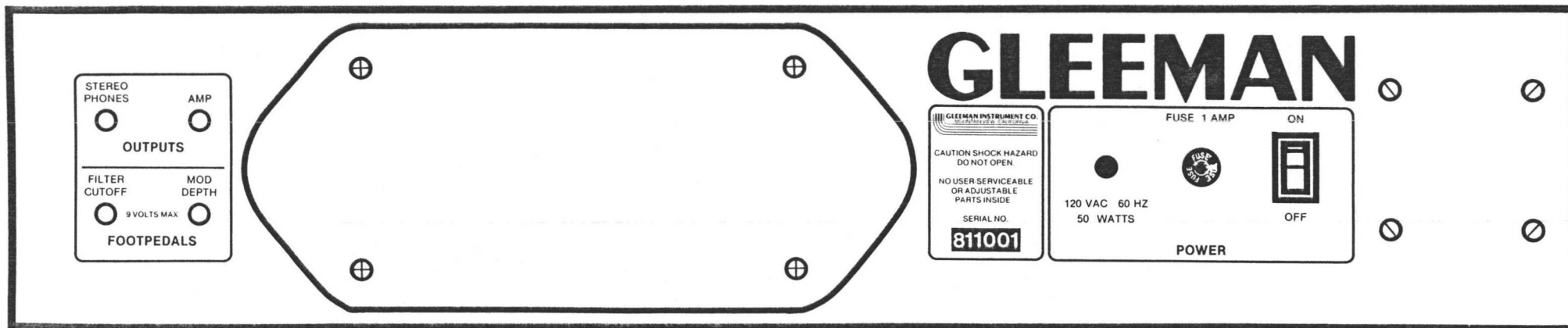


FIGURE 7 REAR PANEL

SECTION 5.3 AMP AND SPEAKER

The Pentaphonic contains a 5-watt audio amplifier and a 4" X 10" speaker. The SEQUENCER and KEYBOARD gain controls vary the loudness of the internal amp.

The magnet of the internal speaker is quite powerful, and so it is recommended that magnetic tape be kept away from the unit and the unit itself should not be operated atop a color television set.

SECTION 5.4 SERIAL NUMBER

The serial number is located on the rear panel between the power cord and speaker. The serial number should be copied into your owner's manual and warranty card. The number is important when seeking warranty service.

SECTION 5.5 LINE CORD

The line cord plugs into a two or three conductor A.C. socket. The A.C. voltage must be between 110 and 120 volts RMS. No grounding of the Pentaphonic is necessary since its case is double insulated. However avoid overcrowded outlets or extension cords rated less than 5 amps.

SECTION 5.6 FUSE

The fuse is located on the rear panel between the line cord and the POWER switch. It should be replaced only when the line cord is unplugged.

To replace the fuse, push on the fuseholder cap labeled FUSE while turning counterclockwise and pull out the cap and fuse together. Replace the fuse with type 1AG or equivalent then push the fuse into the cap. Push the fuse and cap into the fuseholder and rotate clockwise.

SECTION 5.7 POWER SWITCH

The POWER switch is located on the rear panel. Rocking the switch to the ON position applies power to the unit and illuminates the LED pilot light above the Presetter/Joystick panel.

SECTION 6.0 MAINTENANCE

The maintenance which can be performed on the Pentaphonic is mostly external since there are no trimmers to go out of calibration. The only internal maintenance would be cleaning of the gold keyboard contacts. This should be done only by factory authorized repair personnel.

The external maintenance consists mainly of caring for the outer surfaces. A hard-shell or road case is recommended to protect the Pentaphonic's keyboard from serious damage.

Keep beverages away from this unit. Any spills could cause a shock hazard.

The Pentaphonic should never be cleaned with any solvents such as alcohol as they will dissolve the finish. Only mild soap and water should be used to clean surface dirt.

If a knob should come loose pry off the cap and tighten the brass collet nut until the knob is secured. Then replace the cap.

If the Pentaphonic should ever fail to play correctly, try turning the unit off then on. This will reset the internal micro-computer which may have been interrupted by a power line irregularity.

SECTION 7.0 WARRANTY

The Gleeman Pentaphonic is warranted for 1 year from the date of purchase. The warranty card must be filled out and returned within 15 days from date of purchase.

If the Pentaphonic should fail to operate correctly within the warranty period return the unit to a factory authorized repair center. If there are none in your area contact the manufacturer.

Gleeman Instrument Co.
97 Eldora Drive
Mtn. View, CA 94041
Tel. 415-964-1464

A return authorization must be obtained from the manufacturer before a defective unit can be accepted for repair.

The warranty covers only defects in materials and workmanship. Damage due to accidents or misuse is not covered. Damage to the case and keyboard is not covered. All shipping costs to and from Authorized Repair Centers or Gleeman Instruments must be borne by the customer.

Gleeman Instruments is not responsible for loss of presets in the event that the Presetter Module is serviced.

SECTION 8.0 PROGRAMMING WORKSHEET

The PROGRAMMING WORKSHEET in Fig. 8 may be copied for your convenience.

GLEEMAN *Pentaphonic*

PROGRAMMING WORKSHEET

FINE TUNE FLAT SHARP	RATE SLOW FAST	GAIN MIN MAX	GAIN MIN MAX	GAIN MIN MAX	RATE SLOW FAST	CUTOFF LOW HIGH	AMOUNT MIN MAX	RESONANCE MIN MAX	SEQUENCER MIN MAX	KEYBOARD MIN MAX
PITCH C C# D D# E F F# G G# A A# B	DELAY MIN MAX	SHAPE 3% PULSE 12% PULSE 50% PULSE RAMP TRI SINE COMP 1 COMP 2	SHAPE 3% PULSE 12% PULSE 50% PULSE RAMP TRI SINE COMP 1 COMP 2	SHAPE 3% PULSE 12% PULSE 50% PULSE RAMP TRI SINE COMP 1 COMP 2	DEPTH MIN MAX	GLIDE SPEED SLOW FAST	ATTACK FAST SLOW	DECAY FAST SLOW	ATTACK FAST SLOW	DECAY FAST SLOW
CHORUSING FAST <input type="radio"/> SLOW <input type="radio"/>	SEQUENCER PLAY <input type="radio"/> OFF RECORD <input type="radio"/>	OSCILLATOR 1 OCTAVE HIGH <input type="radio"/> LOW <input type="radio"/>	OSCILLATOR 2 OCTAVE HIGH <input type="radio"/> LOW <input type="radio"/>	OSCILLATOR 3 OCTAVE HIGH <input type="radio"/> LOW <input type="radio"/>	MODULATION DESTINATION PITCH <input type="radio"/> GAIN FILTER <input type="radio"/>	KEYBOARD MONO <input type="radio"/> POLY <input type="radio"/>	SUSTAIN MIN MAX	RELEASE FAST SLOW	SUSTAIN MIN MAX	RELEASE FAST SLOW
								FILTER		AMP

NOTES:

PRESET NO: _____